

REMARKS

This is a full and timely response to the outstanding non-final Office Action mailed October 6, 2004. Upon entry of the amendments in this response, claims 22 - 37 remain pending. In particular, Applicant has amended claims 22 and 28 - 30, and has added claims 31 - 37. Reconsideration and allowance of the application and presently pending claims are respectfully requested.

Rejections under 35 U.S.C. 102

The Office Action indicates that claims 22-23, 25-26, 28 and 30 are rejected under 35 U.S.C. 102(b) as being anticipated by AAPA (figure 1-2, page 1-2). Applicant respectfully traverses the rejections.

In this regard, Applicant has amended claim 22. Support for these limitations can be found, for example, in FIG. 6. Therefore, it is respectfully asserted that no new matter has been added. Specifically, claim 22 now recites:

22. A high quantum efficiency image sensor comprising:
a well region of a first conductivity in a substrate of a second conductivity
opposite to said first conductivity wherein said well region in said
substrate forms a photodiode; and
an isolation region within said substrate overlying edge portions of said
photodiode;
***wherein said isolation region comprises a stop layer, located at a bottom
of the isolation region and adjacent to said photodiode; and
wherein a dielectric material fills the isolation region.***

(Emphasis Added).

Applicant respectfully asserts that AAPA does not teach or otherwise disclose at least the features/limitations emphasized above in claim 22. Therefore, Applicant respectfully asserts that claim 22 is in condition for allowance. Insofar as claims 23, 25-26, 28 and 30 are dependent

claims that incorporate the features of claim 22, Applicant respectfully asserts that these claims also are in condition for allowance. Additionally, these claims recite other features that can serve as an independent basis for patentability.

Rejections under 35 U.S.C. 103

The Office Action indicates that claims 24, 27 and 29 are rejected under 35 U.S.C. 103(a) as being anticipated over AAPA (figure 1-2, page 1-2) in view of skill level of ordinary skill in the art. Applicant respectfully traverses the rejections.

As set forth above, Applicant has amended claim 22 to incorporate the features of “wherein said isolation region comprises a stop layer, located at a bottom of the isolation region and adjacent to said photodiode” and “wherein a dielectric material fills the isolation region.” Applicant respectfully asserts that the AAPA, either individually or in combination, fails to teach or reasonably suggest at least these features. Therefore, Applicant respectfully asserts that claims 24, 27 and 29 are in condition for allowance in that these claims are dependent claims that incorporate the features of claim 22. Additionally, these claims recite other features that can serve as an independent basis for patentability.

Newly Added Claims

Upon entry of the amendments in this response, Applicant has added new claims 31 – 37. Applicant respectfully asserts that these claims are in condition for allowance.

In particular, claim 31 recites:

31. A high quantum efficiency sensor comprising:
a well region of a first conductivity in a substrate of a second conductivity
opposite to said first conductivity wherein said well region in said
substrate forms a photodiode; and
an isolation region within said substrate overlying edge portions of said
photodiode;

wherein:

*said isolation region comprises a stop layer located at the bottom
of the isolation region and adjacent to said photodiode;*

*a dielectric material thereon filling the isolation region; and
the stop layer has a refraction index lower than a refraction
index of the well region.*

(Emphasis Added).

Applicant respectfully asserts that the cited art, either individually or in combination, does not teach or reasonably suggest at least the features/limitations emphasized above in claim 31. Therefore, Applicant respectfully asserts that claim 31 is in condition for allowance. Insofar as claim 32 is a dependent claim that incorporates the features of claim 31, Applicant respectfully asserts that this claim also is in condition for allowance. Additionally, this claim recites other features that can serve as an independent basis for patentability.

With respect to claim 33, that claim recites:

33. An image sensor comprising:

a substrate;

a photodiode supported by the substrate; and

*a plurality of layers covering the photodiode, wherein a first of
the layers, located closest to the photodiode, has a higher index of refraction
than a second of the layers, located farther from the photodiode than the first of
the layers.*

(Emphasis Added).

Applicant respectfully asserts that the cited art, either individually or in combination, does not teach or reasonably suggest at least the features/limitations emphasized above in claim 33. Therefore, Applicant respectfully asserts that claim 33 is in condition for allowance. Insofar

as claims 34 - 37 are dependent claims that incorporate the features of claim 33, Applicant respectfully asserts that these claims also are in condition for allowance. Additionally, these claims recite other features that can serve as an independent basis for patentability.

Cited Art of Record

The cited art of record has been considered, but is not believed to affect the patentability of the presently pending claims.

CONCLUSION

In light of the foregoing amendments and for at least the reasons set forth above, Applicant respectfully submits that all objections and/or rejections have been traversed, rendered moot, and/or accommodated, and that the pending claims are in condition for allowance. Favorable reconsideration and allowance of the present application and all pending claims are hereby courteously requested. If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at (770) 933-9500.

No fee is believed to be due in connection with this Amendment and Response to Restriction Requirement. If, however, any fee is believed to be due, you are hereby authorized to charge any such fee to deposit account No. 20-0778.

Respectfully submitted,

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